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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,025	02/17/2004	Wenbin Gu	8540G-000187	9272

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EXAMINER	
AUSTIN, MELISSA J	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/780,025	GU ET AL.	
	Examiner	Art Unit	
	Melissa Austin	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) *34-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-12,14,16,17,19,22 and 24-33* is/are rejected.

7)☒ Claim(s) *9,13,15,18,20,21 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-33, drawn to an electrochemical cell and its associated electroconductive element, classified in class 429, subclass 34.

   II. Claims 34-49, drawn to a method of making an electroconductive element, classified in class 429, subclass 34.

   III. Claim 50, drawn to a method of distributing water within a fuel cell, classified in class 429, subclass 13.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the method of invention II could be used to make a materially different product. The method could produce an electroconductive element with a liquid distribution media of different average pore size than that of invention I. The method of invention II could also be used to form an electroconductive element that is planar and does not form flow channels. The product of invention I may be made by a materially different process, such as one in which the distribution media is applied by casting or coating.

3. Inventions I and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the process for using the product can be practiced with a materially different product. The method of invention III could be practiced with a fuel cell/electroconductive element of a different average pore size than that of invention I. The method of invention III could also be practiced using an electroconductive element that is planar and does not form flow channels.

4. Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions have different modes of operation, functions, effects. Invention II is a method of making that results in an electroconductive element, and invention III is a method of using that a fuel cell. While the method of invention III could be practiced with the electroconductive element produced by the method of invention II, it could also be practiced with an electroconductive element differently formed (different precursor or application technique such as casting or coating).

5. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

6. Because these inventions are distinct for the reasons given above and the search required for any of Groups I-III is not required for any of the other Groups I-III, restriction for examination purposes as indicated is proper.

7. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

8. During a telephone conversation with Anna Buddy on 2 May 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 34-50 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

9. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

10. The Information Disclosure Statement (IDS) filed on 17 February 2004 has been considered by the examiner.

Drawings

11. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 88. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

12. The use of the trademarks TORAY, INCONEL, and METPORE have been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 112

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claim 4 recites the limitation "the average pore size" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

15. Claim 14 recites the limitation "said flow fields" in line 4 of the claim. There is insufficient antecedent basis for this limitation in the claim. It is suggested the claim be amended to read “said flow channels”.

16. Claims 28-30 recite the limitation "said liquid distribution media". There is insufficient antecedent basis for this limitation in the claims. These claims are interpreted replacing “said liquid distribution media” with “said porous layer”, the suggested replacement.

17. The term "relatively" in claims 5, 12, 24, 25, and 32 is a relative term which renders the claim indefinite. The term "relatively" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

18. Claims dependent from claims rejected under 35 USC 112, first and/or second paragraph are also rejected for the same reasons as stated above.

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

20. Claims 1-3, 5-8, 10, 11, 16, 17, 19, 24-26, 28, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Miyazawa et al. (US 2003/0235735 A1). Miyazawa teaches an electrochemical cell having: a membrane electrode assembly (MEA) comprising an anode and cathode (Figure 1, #20); an electroconductive element comprising an impermeable electrically conductive element (ECE) having a major surface facing the cathode (Figure 1, #4b) and a porous liquid distribution media (LDM) disposed along the major surface defining flow channels for transporting gas and liquid to and from the cathode (Figure 2, #14); and an electrically conductive fluid distribution layer (FDL) disposed between the liquid distribution media and the cathode for transporting gases and liquids between the cathode and the flow channels (Figure 1, #21b). The FDL and LDM are constructed and arranged to transport liquids accumulating within the cathode through the FDL and to and through the LDM. The ECE and LDM are arranged together to define the flow channels. The LDM forms an electrically conductive path between the ECE and FDL. The LDM is more hydrophilic than the FDL, overlies substantially all of the major surface of the ECE, is disposed in

regions along the major surface defining separate spaced-apart flow channels. The LDM has an undulated configuration of peaks and valleys. The LDM internally redistributes liquid water. The electroconductive element also comprises a second ECE having a second surface facing the anode, a second LDM along regions of the second surface, and a second FDL disposed between the electroconductive element and anode and in contact with the second LDM. The LDM is composed of a hydrophilic material, for example carbon black, is coated or sprayed onto the major surface, and cured by heat. Miyazawa also teaches an electroconductive element for an electrochemical cell comprising an impermeable electrically conductive element (ECE) having a major surface (Figure 1, #4b) and a conductive, hydrophilic porous layer on the ECE that redistributes water within the layer (Figure 2, #14). The porous layer is in contact with a fluid distribution layer (FDL) that is further in contact and fluid communication with an electrode, either anode or cathode. The porous layer is more hydrophilic than the electrode of FDL and draws water from the electrode through the FDL. The ECE and porous layer are arranged together to define flow channels, and the porous layer has an undulated configuration of peaks and valleys. The porous layer forms an electrically conductive path between the ECE and FDL. (Page 2, [0018]–[0029]; Page 3, [0033], [0036], [0037]; Page 5, [0056], [0057]).

Claim Rejections - 35 USC § 103

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

22. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa et al. (US 2003/0235735) in view of Davis (US 2002/0001743). Miyazawa teaches the elements of claim 1 as discussed above but fails to teach the impermeable electrically conductive element formed of Al, Ti, stainless steel, or alloys or mixtures thereof. Davis teaches that forming bipolar plates using metals with high electrical and thermal conductivity, such as Al, Cu, and Ti, results in plates with electrical conductivity 500 times better and thermal conductivity double that of graphite. This can reduce the effect of localized heating due to areas of localized high current density and voltage drop, such as membrane dry-out. (Page 2, [0007], [0008]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made would have used a bipolar plate made of Al or Ti as taught by Davis in the electrochemical cell as taught by Miyazawa et al. in order to reduce localized heating caused by areas of high current density and large voltage drop.

Allowable Subject Matter

23. Claims 4, 9, 12-15, 18, 20, 21, 23, and 30-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. Claims 4, 12, 14, and 30-33 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

25. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach or suggest: a liquid distribution media pore size; a liquid distribution media formed of two layers or two surfaces (first surface in contact with fluid distribution layer with undulating surface corresponding to flow channels, and second surface opposite first surface, in contact with electrically conductive element, and planar); a liquid distribution media formed of mesh, screen, or foam; a liquid distribution media formed of polymer; a liquid distribution media formed of a plurality of conductive particles; or a liquid distribution media formed by etching of the major surface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Austin whose telephone number is (571) 272-1247. The examiner can normally be reached on Monday - Thursday, alt. Friday, 7:15 AM - 4:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mja
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